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Update from C^{3}RS Lessons Learned Team: Safety Culture and Trend Analysis

SUMMARY

The Federal Railroad Administration (FRA) believes that, in addition to process and technology innovations, human-factors-based solutions can significantly contribute to improving safety in the railroad industry. To test this assumption, FRA implemented the Confidential Close Call Reporting System (C^{3}RS), which includes:

- Confidential reporting;
- Root-cause analysis problem solving by a Peer Review Team (PRT) comprising labor, management, and FRA representatives;
- Implementation of corrective actions;
- Tracking the results of change; and
- Reporting the results of change to employees.

Demonstration pilot sites are currently at Union Pacific Railroad (UP), Canadian Pacific Railway (CP), New Jersey Transit (NJT), and Amtrak [1].

FRA is sponsoring a rigorous evaluation of three important aspects of C^{3}RS functioning:

(1) What conditions are necessary to implement C^{3}RS successfully?

(2) What is the impact of C^{3}RS on safety and safety culture?

(3) What factors help to sustain C^{3}RS over time?

The evaluation is organized into baseline, midterm, and follow-up time periods at each site. To protect company confidentiality, specific sites are not identifed in this report.

This report is part of a series of *Research Results* published to provide the public with the evaluation's findings [2],[3],[4]. Two sets of findings are presented here. The first set consists of baseline and midterm findings at one demonstration site (site A), using three data sources: (1) Railroad Safety Culture Survey; (2) interviews with workers, managers, and other stakeholders; and (3) other project documents, such as meeting notes and newsletters. The second set of findings is based on interviews from all four demonstration sites.

Baseline and Midterm Findings at One Demonstration Site: Safety Culture

Results at this demonstration site indicate that C^{3}RS was implemented successfully and caused an initial improvement in safety culture. Efforts were made to implement an effective PRT Support Team to help review and implement corrective actions.

Cross-Site Findings at Midterm: Trend Analysis

Over time, each railroad has accumulated a rich database of close calls, contributing factors, root causes, and solutions. Railroads are discovering that examining trends across close calls can provide much insight into safety issues. PRTs have analyzed bundles of related cases and developed corrective actions to address system-wide safety issues. Some railroads are utilizing internal and external continuous improvement experts to help undertake this analysis.

BACKGROUND

C^{3}RS contains two critical elements designed to help it succeed in railroad settings:

- Employees' reports of close calls are routed through a neutral third party—the U.S. Bureau of Transportation Statistics (BTS) or the National Aeronautics and Space Administration (NASA), which deidentifies the reports.
- Sanitized information is sent to a joint labor/management/FRA PRT trained in collaborative, root-cause problem solving. The PRT conveys recommendations for corrective action to local and corporate management for review and possible implementation. Additional information is available on FRA's Close Calls Web site [1].

EVALUATION OBJECTIVES

The overall evaluation is intended to provide knowledge about how C^{3}RS can be implemented successfully, its impact on safety and safety culture, and the conditions necessary for long-term viability. Previous *Research Results* summarized earlier evaluation findings [2],[3],[4].

EVALUATION METHODS

Railroad Safety Culture Survey at Site A

The Railroad Safety Culture Survey was developed by the Lessons Learned Team, using a variety of safety culture scales from literature and past U.S. Department of Transportation (U.S. DOT) Volpe Center (Volpe) projects [5]. Some additional questions specific to C^{3}RS were added.

A baseline survey, administered by BTS at this demonstration site, included 240 labor and 28 management responses. The survey was administered again 6 months later in order to increase the response rate. An additional 106 labor responses were obtained. Because of the time lag between surveys, it was possible to examine early changes in safety culture. A midterm survey was not conducted.

Interviews

Two types of interviews were conducted:

- *Phased interviews* at site A at the beginning of the baseline and midterm phases involved railroad employees and managers, both inside and outside of the C^{3}RS program. Interviewees were asked about the impact of C^{3}RS in terms of safety, safety culture, and C^{3}RS program operations.
- *Implementation interviews* at all four sites at both baseline and midterm involved key stakeholders, such as PRT members, senior managers, labor officials, FRA, the Volpe Implementation Team, BTS, and NASA. Interviewees were asked about key events related to the functioning and sustainability of C^{3}RS.

RESULTS AT SITE A

Improvement of Safety Culture within 6 Months at One Site

During the 6 months between administration of the first and second rounds of the baseline survey, the views of labor improved on three scales (two-tailed *p* values):

- Organization Concern for Employees: 23% improvement ($p < 0.00$).
- Supervisor Fairness: 11% improvement ($p = 0.001$).
- Labor-Manager Relations: 9% improvement ($p = 0.01$).

In addition, the data suggested a 5 percent improvement in the area of Organizational Fairness during Change ($p = 0.08$).

Even at this early stage, baseline survey data showed strong support for C^{3}RS. Fifteen percent of respondents had submitted a report; 57 percent personally knew someone who had submitted a report (indicating that people were talking among themselves about the program); 88 percent said that they would recognize an incident that could be reported to C^{3}RS (indicating successful roll out); and 84 percent said that they would be willing to report an incident to C^{3}RS (indicating program acceptance).

Interviews that took place over time during the 18 months after C^{3}RS rollout supported the

survey findings. Labor-management relations improved, and there was a perceived reduction in "blame culture"—that is, less emphasis on finding a person to blame and more interest in determining the causes of the safety issues. There was still some fear of punishment, but there was also optimism that C^{3}RS would lessen management's emphasis on discipline.

Implementation of Corrective Actions by PRT during Early Stages of C^{3}RS

During the baseline phase at Site A, the PRT, with the support of local management, began implementing some corrective actions. Most of the details were not shared with the Lessons Learned Team for reasons of confidentiality. PRT members indicated that recommendations had been conveyed to management and that some local corrective actions were implemented.

The initial corrective actions dealt with employee education through safety-meeting presentations, rule-of-the-week programs, and job aids. An example of a job aid created through C^{3}RS is a flyer about activating a specific remote-control switch; the flyer included diagrams to prevent run-through switches in a location that had had frequent problems.

Later, the PRT reported having recommended system-wide corrective actions. An example from the midterm phase is Crew Resource Management (CRM), which was planned to include signal awareness, signal aspects, and job briefings. The PRT's decision to recommend CRM was influenced by its analysis of many C^{3}RS reports.

Identification of Opportunities to Improve PRT and Support Team Coordination

Site A began operations with a PRT Support Team in place to help review and implement corrective actions. The team met quarterly. Interviews revealed that the original Support Team and the PRT did not communicate enough. Also, the PRT underestimated the effort that would be needed to prepare information in a way that could guide effective decisionmaking by the Support Team.

Implementation interviews revealed that the original Support Team had been combined with another safety team that met infrequently and had other responsibilities. This caused delays in implementing C^{3}RS corrective actions. Also, senior management lacked knowledge about C^{3}RS operations and processes.

Recommendation of Midterm Actions to Improve the Support Team

At midterm, senior management decided to implement a new and improved, smaller, dedicated Support Team that included representatives from the PRT and the corporate safety office. The redesigned Support Team is currently examining past recommendations for corrective actions and determining ways to measure their impact. The Lessons Learned Team will assess the short term impact of the corrective actions. In spite of these changes, opportunites still exist for improvements in communication between the PRT and the Support Team.

Cross-Site Findings: Examination by All Sites of Trends in Their C^{3}RS Data

Initially, the Implementation Team taught each of the PRTs to analyze cases individually. Interest in examining trends grew over time.

For each railroad, C^{3}RS data are stored in a Multiple Cause Incident Analysis (MCIA) database, which contains (1) deidentified information on each case from the third-party data collection agency and (2) results of the PRT's analysis (contributing factors and root causes) and recommended corrective actions. More recently, the database added functionality to track the implementation status of corrective actions.

To support trend analysis, some demonstration sites worked with BTS and NASA to extract trend data for specific types of close calls that were occurring frequently. Using these data, the PRTs created corrective actions to address key root causes for those safety issues. One site worked with a consultant to analyze trends in its data. Another site sought help from continuous improvement experts within its own company.

As interest in trends and grouped cases developed, new uses for the MCIA were envisioned:

- Identifying frequent safety concerns.
- Identifying the underlying contributing factors causing multiple types of safety issues.
- Tracking corrective actions to ensure implementation in a timely and effective manner.

CONCLUSIONS

The demonstration site that was studied in depth successfully implemented C^{3}RS, which positively impacted safety culture, as shown in the survey and interview data. The PRT implemented some corrective actions. The demonstration site learned that the process of involving senior management in reviewing and implementing corrective actions was not simple and so took action to improve it.

Across sites, the railroads saw the value of analyzing trends as opposed to looking only at individual cases. Some of the railroads began using continuous improvement experts to assist with their analysis.

FUTURE DIRECTIONS FOR C^{3}RS EVALUATION

The Evaluation Team will collect follow-up data at all C^{3}RS sites and publish findings.

REFERENCES

[1] *Confidential Close Call Reporting System (C^{3}RS)* Web site, http://www.closecallsrail.org/.
[2] *Confidential Close Call Reporting System: Preliminary Evaluation Findings.* FRA Research Results, December 2008. DOT/FRA/RR08-33.
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[5] *Transformation of Safety Culture on the San Antonio Service Unit of Union Pacific Railroad.* Nov 2012. DOT/FRA/ORD-12/16.

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